25X1

January 3, 1969

25X1
25X1

Attention: 25X1

Dear Sir:

Enclosed please find two (2) copies of our Interim Report on Image Analysis which is being submitted under Task 32. 25X1
In addition, I am enclosing a cost report associated with the Image Analysis Program.

If you have any questions, please do not hesitate to contact me.

Sincerely,

25X1

TJS/md
Enclosures:

TECHNICAL AND FISCAL PROPOSAL
1969 IMAGE ANALYSIS PROGRAM

December 1968

25X1

TABLE OF CONTENTS

Declassified in Part - Sanitized Copy Approved for Release 2012/11/01 : CIA-RDP79B00873A000100010140-8

I INTRODUCTION

The previous image analysis programs have shown that serious errors are made in the taking of measurements from photographic material. These errors are considerably larger than the measurement precision of present readout devices, which implies that utilizing more accurate comparators will not significantly improve the accuracy of measurements. The proposed program has as its goal the improvement of these measurements through the utilization of data that has been collected during previous programs, and in particular, the development of practical operational methods for the use of this data.

Accordingly, the proposed program is divided into three specific tasks, all of which are oriented toward this end goal. These tasks are:

1) Development of Data on Duplication Materials,
2) Field Test,
3) Development of Operational Correction Procedures.

The purpose of the first task is to develop useful correction data for duplication materials, the purpose of the second is to verify results by utilizing operational material (or simulated operational material), and the purpose of the third is to develop pratical methods of improving measurement accuracy. Each of these is explained more fully in the following technical discussions.

II TASK 1 - DEVELOPMENT OF DATA ON DUPLICATION MATERIALS

Since a significant number of measurements are made on duplication material, it is useful to generate a set of error curves for these materials similar to those now available for 3404 original. This would be relatively inexpensive, since the presently available material can be used as the original printing stock, and the computer programs required for analysis are already available. The primary effort would be in taking the required measurements from the duplicated material and setting up the data for computer analysis.

The primary material to be used would be 2430, with the printing and processing parameters identical to those used in the operational situation. This would insure the applicability of the resultant data to material presently being obtained. The execution of this program would also determine whether it would be advantageous to take important measurements from the original material rather than duplications. At present, no quantitative information exists to answer this question.

III TASK 2 - FIELD TESTS

This task would primarily consist of applying some of the measurement correction functions to actual imagery to determine the accuracy and usefulness of the error correction procedures. The test material will be actual aerial photography of special target arrays, with the arrays consisting of geometric shapes of prime interest in mensuration work. The target arrays will be designed in conjunction with customer personnel to insure that the potentially most useful objects are included in the aerial imagery. Measurements will be made on the ground objects and the photographic scale factor accurately measured to provide precise reference measurements.

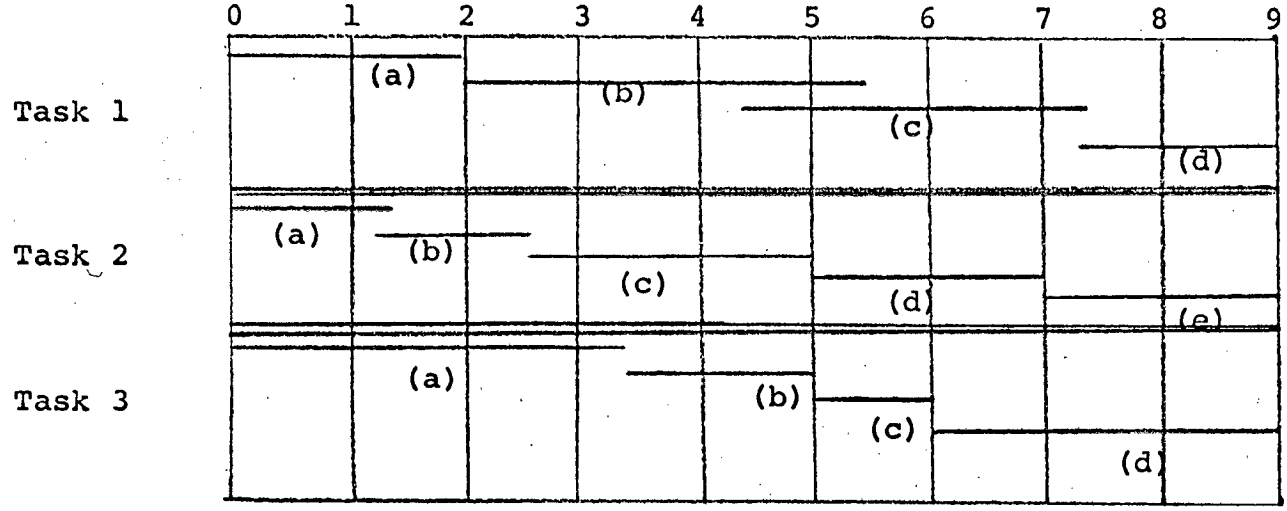
Correction techniques will be applied to measurements taken from the imagery, and thus an evaluation of the usefulness of such techniques on actual imagery can be made.

IV TASK 3 - DEVELOPMENT OF OPERATIONAL CORRECTION PROCEDURES

Previous work in the Image Analysis Program has shown that serious errors exist in measurement of objects on photographic film. Corrections for these errors is somewhat complex due to the fact that the quantitative error is a function of so many variables. Some of these variables are object geometry, size, exposure, contrast, and performance level of the taking system. This makes the application of corrections somewhat difficult in the operational environment, since no simple procedure can be used. The purpose of this task is to develop a technique for the application of the required corrections that is simple enough to use as a tool in operational mensuration work. The preferred form is a special slide rule, in which the variables of importance could be entered as parameters and the correction read directly from the slide rule. The proper scales would be determined from presently available data.

[redacted] has had a large amount of experience in the construction of special slide rules for aerial reconnaissance applications, and would be capable of producing a special slide rule for mensuration with no additional purchase of equipment. The effectiveness of the technique could be evaluated by using the material generated by Task 2. 25X1

V SCHEDULE



Schedule Key

Task 1

(a) Print and Process Material
(b) Measurements & Data Reduction
(c) Analysis
(d) Reporting

Task 2

(a) Selection of Target Array
(b) Taking and Development of Imagery
(c) Measurement of Imagery
(d) Data Analysis
(e) Reporting

Task 3

(a) Development of Scales
(b) Evaluation of Design
(c) Design
(d) Production